

AMENDMENTS TO THE CLAIMS:

Please amend the claims as follows:

1. (Original) An electric power steering apparatus having a steering system capable of flexibly setting a relationship between a steering angle of a steering wheel and a wheel angle of a tire, comprising:

a first motor for controlling a steering reaction force exerted on said steering wheel;

an on-center region determination section for determining whether said steering wheel is in a position of an on-center region;

a tire reaction force torque detection section for detecting tire reaction force torque transferred from said tire; and

a control section for calculating steering torque based on said tire reaction force torque detected by said tire reaction force torque detection section and a torque gain, and for controlling said first motor to exert said steering reaction force corresponding to said calculated steering torque on said steering wheel,

wherein said control section sets said torque gain in case of determining that said steering wheel is in the position of said on-center region larger than said torque gain in case of determining that said steering wheel is not in the position of said on-center region.

2. (Original) The electric power steering apparatus according to claim 1, further comprising:

a steering angle detection section for detecting said steering angle of said steering wheel; and

a second motor for controlling said wheel angle of said tire,

wherein said control section calculates said wheel angle based on said steering angle detected by said steering angle detection section and an angle gain as a fixed value, and controls said second motor so that said wheel angle of said tire corresponds said calculated wheel angle.

3. (Original) An electric power steering apparatus having a steering system capable of flexibly setting a relationship between a steering angle of a steering wheel and a wheel angle of a tire, comprising:

- a first motor for controlling steering reaction force exerted on said steering wheel;
- a second motor for controlling said wheel angle of said tire;
- a steering angle detection section for detecting said steering angle of said steering wheel;
- an on-center region determination section for determining whether said steering wheel is in a position of an on-center region;

- a tire reaction force torque detection section for detecting tire reaction force torque transferred from said tire; and

- a control section for calculating a steering torque based on said tire reaction force torque detected by said tire reaction force torque detection section and a torque gain, for controlling said first motor to exert said steering reaction force corresponding to said calculated steering torque on said steering wheel, for calculating said wheel angle based on said steering angle detected by said steering angle detection section and an angle gain, and for controlling said second motor so that said wheel angle of said tire corresponds to said calculated wheel angle,

wherein said control section sets said torque gain in case of determining that said steering wheel is in the position of said on-center region larger than said torque gain in case of determining that said steering wheel is not in the position of said on-center region, and sets said angle gain in case of determining that said steering wheel is in the position of said on-center region smaller than said angle gain in case of determining that said steering wheel is not in the position of said on-center region.

4. (Original) An electric power steering apparatus having a steering system capable of flexibly setting a relationship between a steering angle of a steering wheel and a wheel angle of a tire, comprising:

- a first motor for controlling steering reaction force exerted on said steering wheel;
- a second motor for controlling said wheel angle of said tire;
- a steering wheel angle detection section for detecting said steering angle of said steering wheel;

an on-center region determination section for determining whether said steering wheel is in a position of an on-center region;

a tire reaction force torque detection section for detecting tire reaction force torque transferred from said tire; and

a control section for calculating steering torque based on said tire reaction force torque detected by said tire reaction force torque detection section and a torque gain, controlling said first motor to exert said steering reaction force corresponding to said calculated steering torque on said steering wheel, for calculating said wheel angle based on said steering angle detected by said steering angle detection section and an angle gain, and controlling said second motor so that said wheel angle of said tire corresponds to said calculated wheel angle,

wherein said control section sets said torque gain in case of determining that said steering wheel is in the position of said on-center region smaller than said torque gain in case of determining that said steering wheel is not in the position of said on-center region, and sets said angle gain in case of determining that said steering wheel is in the position of said on-center region larger than said angle gain in case of determining that said steering wheel is not in the position of said on-center region.

5. (Currently Amended) The electric power steering apparatus according to claim 1, 2 or 4, wherein said on-center region determination section determines that said steering wheel is in the position of said on-center region, in case that an absolute value of said steering reaction force corresponding to said calculated steering torque is a predetermined threshold value or smaller.

6. (Currently Amended) The electric power steering apparatus according to claim 1, 2 or 4, further comprising:

a steering torque detection section for detecting said steering torque of said steering wheel,
wherein said on-center region determination section determines that said steering wheel is in the position of said on-center region, in case that an absolute value of said steering torque detected by said steering torque detection section is a predetermined threshold value or smaller.

7. (Currently Amended) The electric power steering apparatus according to claim 1, 2 or 4, wherein said on-center region determination section determines whether said steering wheel is in the position of said on-center region, based on a lateral acceleration of a vehicle, said tire reaction force, or said steering angle.

8. (Original) The electric power steering apparatus according to claim 7, wherein said control section sets said angle gain or said torque gain in response to a vehicle condition amount indicating a driving condition of said vehicle.

9. (Currently Amended) The electric power steering apparatus according to claim 1, 2 or 4, wherein said control section sets said angle gain or said torque gain in response to a vehicle condition amount indicating a driving condition of said vehicle.

10. (Original) The electric power steering apparatus according to claim 8, wherein said vehicle condition amount includes at least a vehicle speed.

11. (Original) The electric power steering apparatus according to claim 10, wherein said control section determines driving stability of said vehicle based on a distance on a stability determination map, and changes said angle gain and said torque gain in response to said determination result, said stability determination map defining a relationship between a yaw rate and a skid angle of said vehicle, said distance being obtained by connecting between a coordinate point and an origin on said stability determination map, said coordinate point being identified by the skid angle and the yaw rate.

12. (Currently Amended) The electric power steering apparatus according to claim 1, 2 or 4, wherein said control section determines driving stability of said vehicle based on a distance on a stability determination map, and changes said angle gain and said torque gain in response to said determination result, said stability determination map defining a relationship between a yaw rate and a skid angle of said vehicle, said distance being obtained by connecting between a coordinate point

and an origin on said stability determination map, said coordinate point being identified by the skid angle and the yaw rate.

13. (Original) The electric power steering apparatus according to claim 12, wherein said control section estimates a road surface friction condition, and changes said angle gain and said torque gain in response to said estimation result.

14. (Currently Amended) The electric power steering apparatus according to claim 1, 2 or ~~4~~, wherein said control section estimates a road surface friction condition, and changes said angle gain and said torque gain in response to said estimation result.

15. (Currently Amended) The electric power steering apparatus according to claim 1, 2 or ~~4~~, wherein said control section sets an upper limit value and a lower limit value with respect to at least either said angle gain or said torque gain.

16. (Currently Amended) The electric power steering apparatus according to claim 1, 2 or ~~4~~, wherein said control section sets an upper limit value and a lower limit value with respect to at least either said angle gain or said torque gain.

17. (New) The electric power steering apparatus according to claim 2, wherein said on-center region determination section determines that said steering wheel is in the position of said on-center region, in case that an absolute value of said steering reaction force corresponding to said calculated steering torque is a predetermined threshold value or smaller.

18. (New) The electric power steering apparatus according to claim 4, wherein said on-center region determination section determines that said steering wheel is in the position of said on-center region, in case that an absolute value of said steering reaction force corresponding to said calculated steering torque is a predetermined threshold value or smaller.

19. (New) The electric power steering apparatus according to claim 2, further comprising:
a steering torque detection section for detecting said steering torque of said steering wheel,
wherein said on-center region determination section determines that said steering wheel is
in the position of said on-center region, in case that an absolute value of said steering torque detected
by said steering torque detection section is a predetermined threshold value or smaller.

20. (New) The electric power steering apparatus according to claim 4, further comprising:
a steering torque detection section for detecting said steering torque of said steering wheel,
wherein said on-center region determination section determines that said steering wheel is
in the position of said on-center region, in case that an absolute value of said steering torque detected
by said steering torque detection section is a predetermined threshold value or smaller.